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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,718	07/20/2007	Yoshiki Nishibayashi	050212-0730	9399

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EXAMINER	
MILLER, DANIEL H	
ART UNIT	PAPER NUMBER
1794	
MAIL DATE	DELIVERY MODE
12/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/594,718	NISHIBAYASHI ET AL.	
	Examiner	Art Unit	
	DANIEL MILLER	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/29/2006and 12/11/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 14-18 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 2001015012 (translation).

3. JP '012 teaches an emitter formed from pyramid shaped diamond protrusions having a height of 1 micrometer and a density of 25 projections per micrometer [0014-16].

4. Therefore, given the density of the diamond tips and the height of the tips the emitter would inherently have an apex angle within applicant's claimed range.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 9-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2001015012 (translation) in view of Baik (Thin Solid Films 377-378 (2000) 29-302) further in view of Cathey (US 6,423,239) and Ageno (US 5,449,435).

7. JP '012 teaches an emitter formed from pyramid shaped diamond protrusions having a height of 1 micrometer and a density of 25 projections per micrometer [0014-16].

8. Baik teaches a method of producing a group of cone shaped diamond protrusion by using a patterned mask (wherein the method is concerned with uniformity). The silicon based mask is first applied as a uniform layer, then the mask is ion etched of into a pattern (removing portions of it and leaving holes), then the diamond layer is etched using an air plasma (laser) source. The mask dots have an edge that is considered to be inversely tapered from the aperture opening when formed by the etching process (see figures). Baik teaches that by varying the thickness and diameter of the patterned mask as well as processing time the sharpness of the tips (and therefore the diameter of tips, and aspect ratio, and apex angle) of the cone shaped diamond protrusions can be controlled.

9. Cathey (US 6,423,239) teaches a substantially similar method of producing a cone shaped protrusion with a two layered (30 and 32 from figures) masking and resist system.

10. Ageno (US 5,449,435) et al teaches a diamond protrusion produced using a multilayered masking and resist layer (see figures). The mask layer 202 (figures 5-11) is capable of being fabricated by several different methods, such as photolithography or a

combination of deposition, photolithography, and etching processes to produce a hard mask such as a silicon-nitride mask. By selecting a preferred masking material, greater latitude of processing parameters is capable of being realized.

11. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the claimed process and product, given what is known by one of ordinary skill in the art, the substantial similarity of the above disclosed processes and the desired product of JP'012 and include a multilayered mask of Cathey to obtain sharper tips, and an optimal silicon nitride layer of stochiometrically stable proportions (obtaining applicant's claimed range) as a masking layer in order to provide a greater latitude of processing parameters being realized, wherein the greater latitude in processing parameters would allow for the processing time to be manipulated so that the size of the tips (and therefore the diameter of the tips, aspect ratio, and apex angle) of the cone shaped diamond protrusions can be controlled to form structures within the parameters of Baik and applicant's claimed invention. No patentable distinction is seen.

12. Given the density of the diamond tips taught by JP '012 and the height of the tips the emitter (1 micron), one of ordinary skill would expect that the apex angle would inherently be within applicant's claimed range; or in the alternative it would have been obvious to provide the apex angle, as claimed, or to naturally arrive at an apex angle within the disclosed range through the use of the above described known techniques, given the similarities between the claimed methods and the combined taught method, in order to form the density of protrusions taught by JP '012. No patentable distinction is seen.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL MILLER whose telephone number is (571)272-1534. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel Miller/
Examiner, Art Unit 1794

/KEITH D. HENDRICKS/

Supervisory Patent Examiner, Art Unit 1794